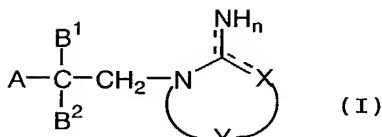


CLAIMS

1. Heterocyclic compounds represented by the following formula (I):



5

wherein:

A is optionally substituted alkyl group; optionally substituted aryl group; or optionally substituted heterocyclic group;

10 B¹ and B² are, hydrogen atom; alkyl group; or hydroxyl group; or combined together to represent carbonyl group;

X is oxygen atom; sulfur atom; carbon atom; or nitrogen atom;

dotted line shows either presence or absence of bond;

15 n is integer of 1 or 2; and

Y is,

(1) in the case of X is oxygen atom, group -Y-X- is -CH₂-CH₂-O- or -CH₂-CH₂-CH₂-O-;

20 (2) in the case of X is sulfur atom, group -Y-X- is -CH₂-CH₂-S- or -C(R¹)=C(R²)-S- (in which, R¹ and R² are hydrogen atom; halogen atom; optionally substituted alkyl group; optionally substituted aryl group; or optionally substituted heterocyclic group);

25 (3) in the case of X is carbon atom, group -Y-X- is -CH₂-CH₂-CH₂-CH₂- , -CH=C(R³)-C(R⁴)=CH- or -N=C(R⁵)-C(R⁶)=CH- (in which, R³, R⁴, R⁵ and R⁶ are hydrogen atom; halogen atom; optionally substituted alkyl group; optionally substituted aryl group; or optionally substituted heterocyclic group); and,

30 (4) in the case of X is nitrogen atom, group -Y-X- is -CH₂-CH₂-NH- , -CH₂-CH₂-CH₂-NH- , -C(R⁷)=C(R⁸)-N=, or -C(R⁹)=C(R¹⁰)-

$C(R^{11})=N-$ (in which, R^7 , R^8 , R^9 , R^{10} and R^{11} are hydrogen atom; halogen atom; optionally substituted alkyl group; optionally substituted aryl group; or optionally substituted heterocyclic group);

5 or pharmaceutically acceptable salts thereof.

2. The following compounds represented by the formula (I) of claim 1;

2-imino-3-phenacylthiazolidine;

10 3-acetonyl-2-imino-2,3-dihydrothiazole;

1-[2-(6-chloro-3-pyridyl)ethyl]-2-imino-1,2-dihdropyrimidine;

3-[2-(6-chloro-3-pyridyl)ethyl]-2-imino-4-methyl-2,3-dihydrothiazole;

3-[2-(6-chloro-3-pyridyl)ethyl]-2-iminothiazolidine;

15 3-[2-(6-chloro-3-pyridyl)ethyl]-2-imino-5-methyl-2,3-dihydrothiazole;

2-amino-1-[2-(6-chloro-3-pyridyl)ethyl]imidazole;

1-(6-chloro-3-pyridyl)-2-(2-imino-3-thiazolidinyl)-1-ethanone;

1-(6-chloro-3-pyridyl)-2-(2-imino-3-thiazolidinyl)-1-ethanol;

20 3-[2-(6-chloro-3-pyridyl)ethyl]-2-imino-4,5-dimethyl-2,3-dihydrothiazole;

2-amino-1-[2-(6-methyl-3-pyridyl)ethyl]imidazole;

1-[2-(6-chloro-3-pyridyl)ethyl]-2-imino-1,2,3,4,5,6-hexahydro-pyrimidine;

25 2-amino-1-[2-(5,6-dichloro-3-pyridyl)ethyl]imidazole;

2-amino-1-[2-(3-pyridyl)ethyl]imidazole;

6-chloro-2-[2-(6-chloro-3-pyridyl)ethyl]-3-imino-2,3-dihydro-pyridazine;

1-[2-(6-chloro-3-pyridyl)ethyl]-2-imino-1,2-dihdropyridine;

30 2-amino-1-[2-(4-chlorophenyl)ethyl]imidazole;

3-[2-(6-chloro-3-pyridyl)propyl]-2-imino-2,3-dihydrothiazole;

2-amino-1-[2-(2-pyridyl)ethyl]imidazole;

2-amino-1-[2-(4-pyridyl)ethyl]imidazole;
2-amino-1-[2-(6-chloro-3-pyridyl)ethyl]-4,5-dimethylimidazole;
3-[2-(6-chloro-3-pyridyl)ethyl]-2-imino-2,3-dihydrothiazole;
2-amino-1-[2-(2-chloro-5-thiazolyl)ethyl]imidazole;
5 3-[2-(2-chloro-5-thiazolyl)ethyl]-2-imino-2,3-dihydrothiazole;
2-amino-1-[2-(5-bromo-3-pyridyl)ethyl]imidazole;
2-amino-1-[2-(4-hydroxyphenyl)ethyl]imidazole;
2-amino-1-[2-(5-methyl-3-pyridyl)ethyl]imidazole;
2-imino-3-[2-(5-methyl-3-pyridyl)ethyl]-2,3-dihydrothiazole;
10 2-amino-1-[2-(5-pyrimidyl)ethyl]imidazole;
2-amino-1-[2-(3-pyridazinyl)ethyl]imidazole;
2-amino-1-[2-(2-pyrazinyl)ethyl]imidazole;
2-amino-1-{2-[2-(4-hydroxyphenyl)thiophenyl]ethyl}imidazole;
2-amino-1-{2-[2-(4-methoxyphenyl)thiophenyl]ethyl}imidazole;
15 2-amino-1-[2-(4-pyridazinyl)ethyl]imidazole;
2-amino-1-[2-(4-chloro-5-pyrimidyl)ethyl]imidazole.
and pharmaceutically acceptable salt thereof.

3. Activators for $\alpha 4\beta 2$ nicotinic acetylcholine receptors
20 containing the compound or pharmaceutically acceptable salt
thereof claimed in claim 1 or 2, as active ingredient.

4. The activators for $\alpha 4\beta 2$ nicotinic acetylcholine receptors
according to claim 3, wherein said activators are agonists or
25 modulators at $\alpha 4\beta 2$ nicotinic acetylcholine receptors.

5. A medicament for preventing or treating cerebral
circulation diseases comprising the activator for $\alpha 4\beta 2$ nicotinic
acetylcholine receptors claimed in claim 3 or 4.
30

6. A medicament for preventing or treating neurodegenerative
disease, dementia, motor ataxia, and neuropathy and mental

disease comprising the activator for $\alpha 4\beta 2$ nicotinic acetylcholine receptors claimed in claim 3 or 4.

7. The medicament according to claim 6, wherein said
5 neurodegenerative disease is Alzheimer's disease or Parkinson's disease, said dementia is cerebrovascular dementia, said motor ataxia is Tourette's syndrome, and said neuropathy and mental disease is neurosis during chronic cerebral infarction stage, anxiety or schizophrenia.

10

8. A medicament for improving the cerebral metabolism, neurotransmission functional disorder and memory disorder, for protecting brain, or having analgesic effect, which comprises the activator for $\alpha 4\beta 2$ nicotinic acetylcholine receptors claimed in claim 3 or 4.

9. A medicament for preventing or treating inflammatory intestinal diseases comprising the activator for $\alpha 4\beta 2$ nicotinic acetylcholine receptors claimed in claim 3 or 4.

20

10. The use of the compounds claimed in claim 1 or 2 as the activators for $\alpha 4\beta 2$ nicotinic acetylcholine receptors.

11. The method of preventing or treating cerebral circulation
25 diseases which comprises administering activators for $\alpha 4\beta 2$
nicotinic acetylcholine receptors claimed in claim 3 or 4.

12. The method of preventing or treating neurodegenerative disease, dementia, motor ataxia, and neuropathy and mental 30 disease which comprises administering activators for $\alpha 4\beta 2$ nicotinic acetylcholine receptors claimed in claim 3 or 4.

13. The method according to claim 12, wherein said neuro-degenerative disease is Alzheimer's disease or Parkinson's disease, said dementia is cerebrovascular dementia, said motor ataxia is Tourette's syndrome, and said neuropathy and mental 5 disease is neurosis during chronic cerebral infarction stage, anxiety or schizophrenia.